

AMENDMENTS

In the Claims:

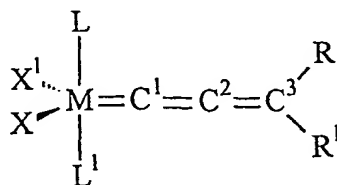
Please cancel claims 10, 15 and 16. Please amend claims 9, 11, 13, 14, 17, 23-28, and 32-34; and add new claims 39-78 as described below:

We have attached to this response a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

Amended Claims

Please amend 9, 11, 13, 14, 17, 23-28, and 32-34 as follows:

9. (Amended) A catalytic complex of the formula:



wherein M is Os or Ru;

C¹ and C² are sp-hybridized carbons and C³ is an sp² hybridized carbon, wherein either or both of C¹ and C² are optionally absent;

R and R¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each R and R¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy;

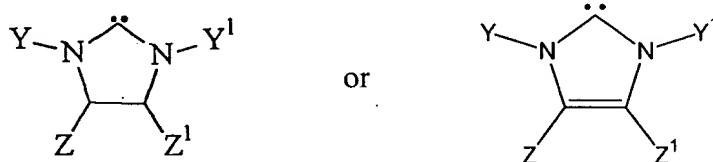
X and X¹ are independently selected from the group consisting of anionic ligands;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L^1 is a nucleophilic carbene.

11. (Amended) A catalytic complex according to claim 9, wherein L is a phosphine.

13. (Amended) A catalytic complex according to claim 9, wherein said nucleophilic carbene is of the formula:

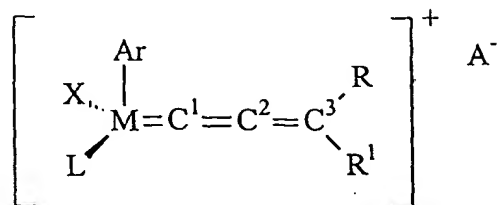


wherein

Y and Y^1 are independently selected from the group consisting of hydrogen, C_1 - C_{20} alkyl, C_2 - C_{20} alkenyl, C_2 - C_{20} alkynyl, C_2 - C_{20} alkoxy carbonyl, aryl, C_1 - C_{20} carboxylate, C_1 - C_{20} alkoxy, C_2 - C_{20} alkenyloxy, C_2 - C_{20} alkynyloxy, or aryloxy, each Y and Y^1 optionally being substituted with C_1 - C_5 alkyl, halogen, C_1 - C_6 alkoxy, or with a phenyl group substituted with halogen, C_1 - C_5 alkyl or C_1 - C_5 alkoxy and;

Z and Z^1 are independently selected from the group consisting of hydrogen, C_1 - C_{20} alkyl, C_2 - C_{20} alkenyl, C_2 - C_{20} alkynyl, C_2 - C_{20} alkoxy carbonyl, aryl, C_1 - C_{20} carboxylate, C_1 - C_{20} alkoxy, C_2 - C_{20} alkenyloxy, C_2 - C_{20} alkynyloxy, or aryloxy, each Z and Z^1 optionally being substituted with C_1 - C_5 alkyl, halogen, C_1 - C_6 alkoxy, or with a phenyl group substituted with halogen, C_1 - C_5 alkyl or C_1 - C_5 alkoxy.

14. (Amended) A catalytic complex of the formula:



wherein

C^1 and C^2 are sp-hybridized carbons and C^3 is an sp^2 -hybridized carbon,

wherein either or both of C^1 and C^2 are optionally absent;

M is selected from the group consisting of Os and Ru;

R and R^1 are independently selected from the group consisting of hydrogen, C_1 - C_{20} alkyl, C_2 - C_{20} alkenyl, C_2 - C_{20} alkynyl, C_2 - C_{20} alkoxycarbonyl, aryl, C_1 - C_{20} carboxylate, C_1 - C_{20} alkoxy, C_2 - C_{20} alkenyloxy, C_2 - C_{20} alkynyloxy, or aryloxy, each R and R^1 optionally being substituted with C_1 - C_5 alkyl, halogen, C_1 - C_6 alkoxy, or with a phenyl group substituted with halogen, C_1 - C_5 alkyl or C_1 - C_5 alkoxy;

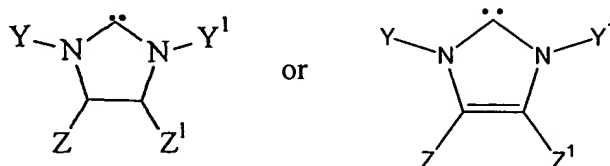
X is an anionic ligand; and

L is a nucleophilic carbene; and

Ar is an aryl substituent, bonded to M by an η^6 bond.

A^- is an inorganic anion or an organic anion.

17. (Amended) A catalytic complex according to claim 14, wherein said nucleophilic carbene is of the formula:

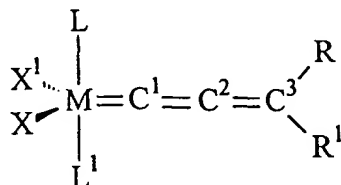


wherein

Y and Y¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Y and Y¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy and;

Z and Z¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Z and Z¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy.

23. (Amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the formula:



wherein M is Os or Ru;

C¹ and C² are sp-hybridized carbons and C³ is a sp²-hybridized carbon, wherein either or both of C¹ and C² are optionally absent;

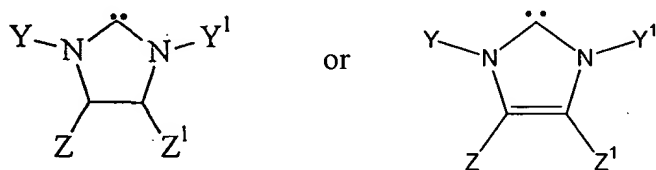
R and R¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each R and R¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy;

X and X¹ are independently selected from the group consisting of anionic ligands;

L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L¹ is a nucleophilic carbene.

24. (Amended) The method of claim 23, wherein the nucleophilic carbene has the formula:

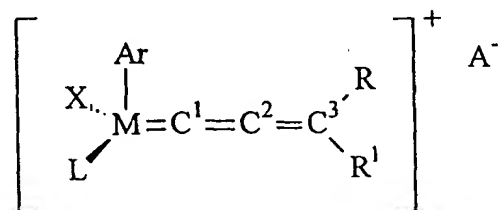


wherein

Y and Y¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxy carbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Y and Y¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy and;

Z and Z¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxy carbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Z and Z¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy.

25. (Amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the formula:



wherein

C^1 and C^2 are sp-hybridized carbons and C^3 is an sp^2 -hybridized carbon, wherein either or both of C^1 and C^2 are optionally absent;

M is selected from the group consisting of Os and Ru;

R and R^1 are independently selected from the group consisting of hydrogen, $\text{C}_1\text{-C}_{20}$ alkyl, $\text{C}_2\text{-C}_{20}$ alkenyl, $\text{C}_2\text{-C}_{20}$ alkynyl, $\text{C}_2\text{-C}_{20}$ alkoxycarbonyl, aryl, $\text{C}_1\text{-C}_{20}$ carboxylate, $\text{C}_1\text{-C}_{20}$ alkoxy, $\text{C}_2\text{-C}_{20}$ alkenyloxy, $\text{C}_2\text{-C}_{20}$ alkynyloxy, or aryloxy, each R and R^1 optionally being substituted with $\text{C}_1\text{-C}_5$ alkyl, halogen, $\text{C}_1\text{-C}_6$ alkoxy, or with a phenyl group substituted with halogen, $\text{C}_1\text{-C}_5$ alkyl or $\text{C}_1\text{-C}_5$ alkoxy;

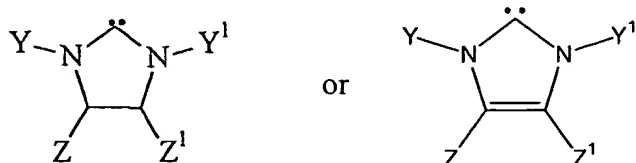
X is an anionic ligand; and

L is a nucleophilic carbene; and

Ar is an aryl substituent, bonded to M by an η^6 bond

A^- is an inorganic anion or an organic anion.

26. (Amended) The method of claim 25, wherein the nucleophilic carbene has the formula:



wherein

Y and Y¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Y and Y¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy and;

Z and Z¹ are independently selected from the group consisting of hydrogen, C₁-C₂₀ alkyl, C₂-C₂₀ alkenyl, C₂-C₂₀ alkynyl, C₂-C₂₀ alkoxycarbonyl, aryl, C₁-C₂₀ carboxylate, C₁-C₂₀ alkoxy, C₂-C₂₀ alkenyloxy, C₂-C₂₀ alkynyloxy, or aryloxy, each Z and Z¹ optionally being substituted with C₁-C₅ alkyl, halogen, C₁-C₆ alkoxy, or with a phenyl group substituted with halogen, C₁-C₅ alkyl or C₁-C₅ alkoxy.

27. (Amended) The catalytic complex according to claim 9, wherein X and X¹ are independently selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

28. (Amended) The catalytic complex according to claim 27, wherein X and X¹ are both chloride.

32. (Amended) The catalytic complex according to claim 9, wherein the complex is linked to a solid support by means of a link between the nucleophilic carbene and said solid support.

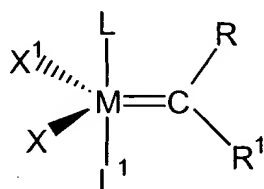
33. (Amended) The catalytic complex according to claim 14, wherein X is selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

34. (Amended) The catalytic complex according to claim 33, wherein X is chloride.

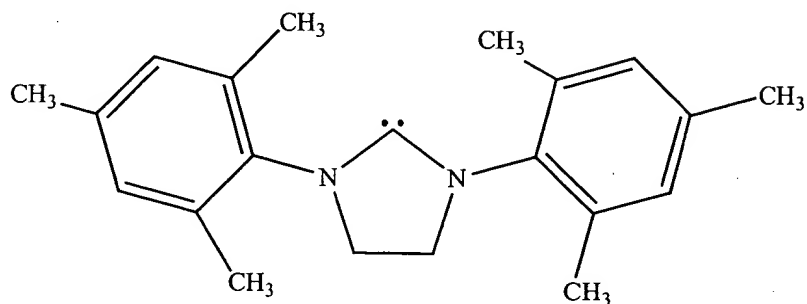
Added Claims

Please add new claims 39-78 as follows:

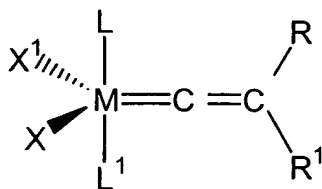
39. (New) The catalytic complex according to claim 9, wherein the catalytic complex has the formula:



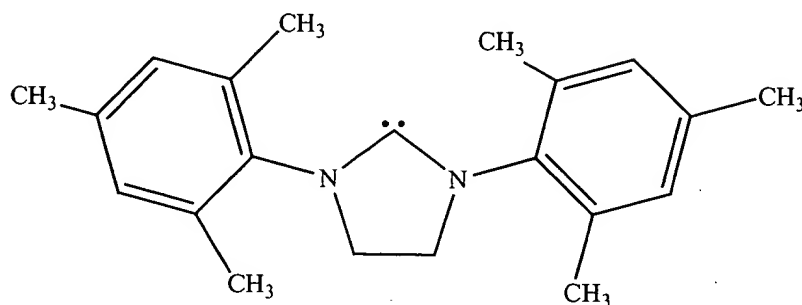
40. (New) The catalytic complex according to claim 39, wherein L is -P(cyclohexyl)₃, -P(cyclopentyl)₃, or -PPh₃; and L¹ is



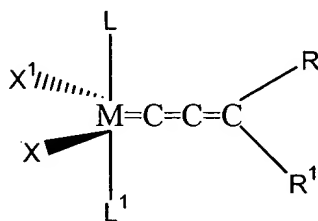
41. (New) The catalytic complex according to claim 9, wherein the catalytic complex has the formula:



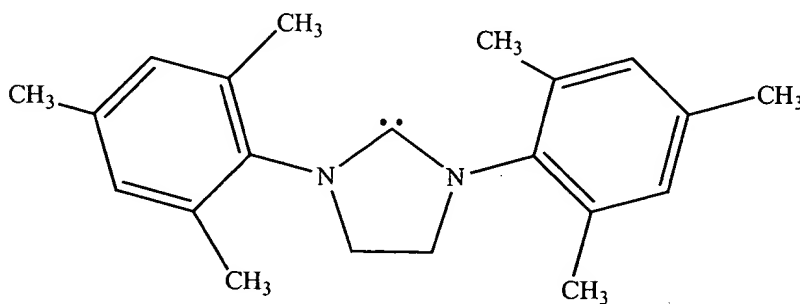
42. (New) The catalytic complex according to claim 41, wherein L is -
 $\text{P}(\text{cyclohexyl})_3$, $\text{-P}(\text{cyclopentyl})_3$, or -PPh_3 ; and L^1 is



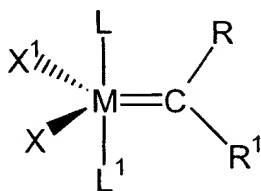
43. (New) The catalytic complex according to claim 9, wherein the catalytic complex
 has the formula:



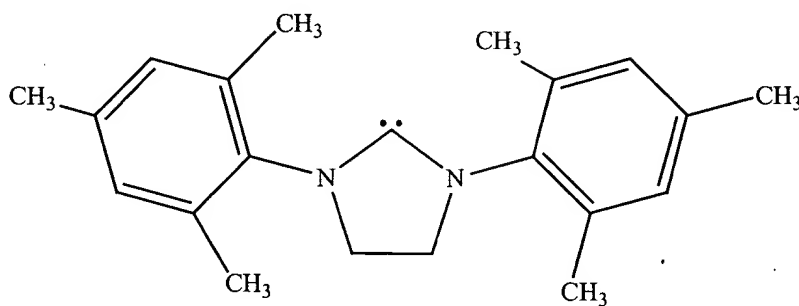
44. (New) The catalytic complex according to claim 43, wherein L is -
 $\text{P}(\text{cyclohexyl})_3$, $\text{-P}(\text{cyclopentyl})_3$, or -PPh_3 ; and L^1 is



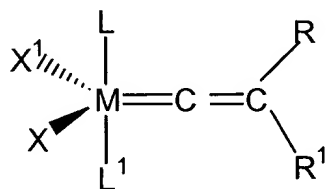
45. (New) The method according to claim 23, wherein the catalytic complex has the formula:



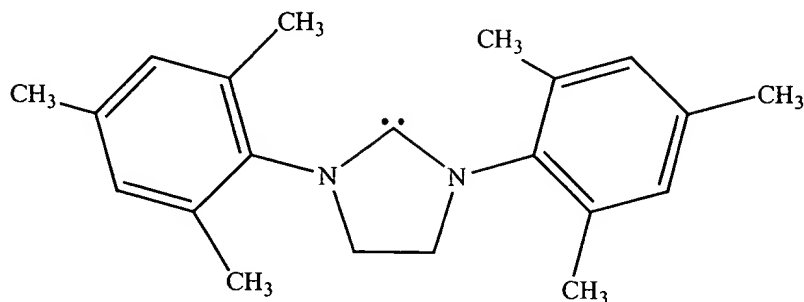
46. (New) The method according to claim 45, wherein L is -P(cyclohexyl)₃, -P(cyclopentyl)₃, or -PPh₃; and L¹ is



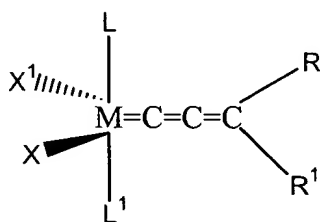
47. (New) The method according to claim 23, wherein the catalytic complex has the formula:



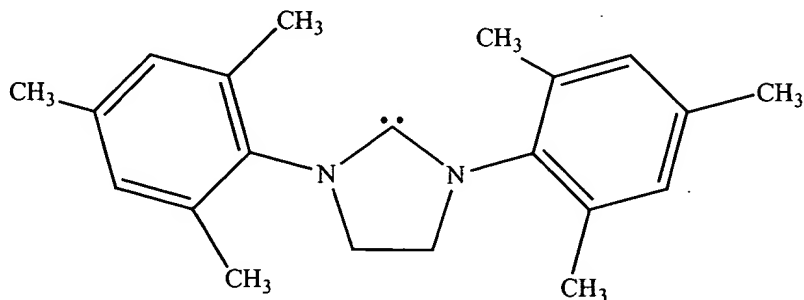
48. (New) The method according to claim 47, wherein L is -P(cyclohexyl)₃, -P(cyclopentyl)₃, or -PPh₃; and L¹ is



49. (New) The method according to claim 23, wherein the catalytic complex has the formula:

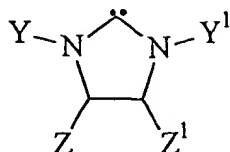


50. (New) The method according to claim 49, wherein L is -P(cyclohexyl)₃, -P(cyclopentyl)₃, or -PPh₃; and L¹ is

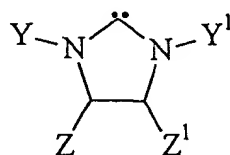


51. (New) A catalytic complex according to claim 13, wherein Y and Y¹ are both 2,4,6-trimethylphenyl and Z and Z¹ are both hydrogen.
52. (New) A catalytic complex according to claim 13, wherein Y and Y¹ are both 2,6-diisopropylphenyl and Z and Z¹ are both hydrogen.
53. (New) A catalytic complex according to claim 17, wherein Y and Y¹ are both 2,4,6-trimethylphenyl and Z and Z¹ are both hydrogen.
54. (New) The catalytic complex according to claim 17, wherein Y and Y¹ are both 2,6-diisopropylphenyl and Z and Z¹ are both hydrogen.
55. (New) The method according to claim 24, wherein Y and Y¹ are both 2,4,6-trimethylphenyl and Z and Z¹ are both hydrogen.
56. (New) The method according to claim 24, wherein Y and Y¹ are both 2,6-diisopropylphenyl and Z and Z¹ are both hydrogen.
57. (New) The method according to claim 26, wherein Y and Y¹ are both 2,4,6-trimethylphenyl and Z and Z¹ are both hydrogen.
58. (New) The method according to claim 26, wherein Y and Y¹ are both 2,6-diisopropylphenyl and Z and Z¹ are both hydrogen.

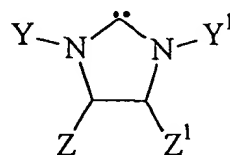
59. (New) A catalytic complex according to claim 13, wherein said nucleophilic carbene is of the formula:



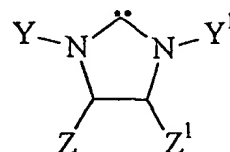
60. (New) A catalytic complex according to claim 17, wherein said nucleophilic carbene is of the formula:



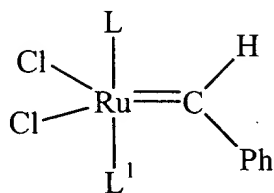
61. (New) The method of claim 24, wherein the nucleophilic carbene has the formula:



62. (New) The method of claim 26, wherein the nucleophilic carbene has the formula:



63. (New) A catalytic complex of the formula:

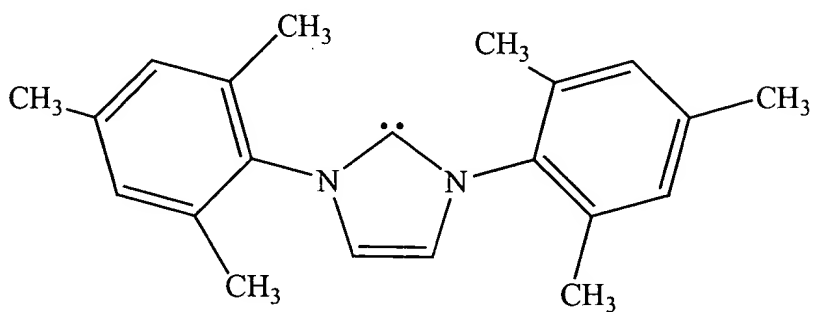


wherein

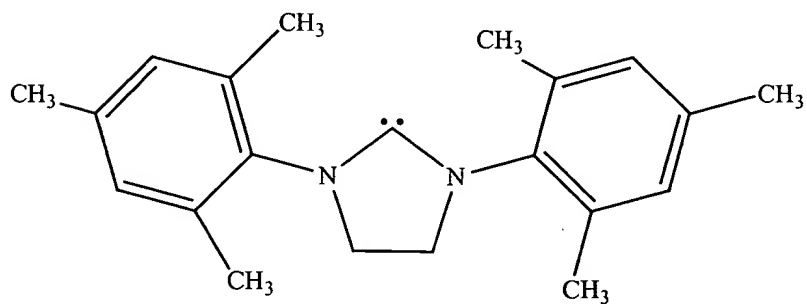
L is -P(phenyl)₃, -P(cyclohexyl)₃, or -P(cyclopentyl)₃; and

L¹ is a nucleophilic carbene.

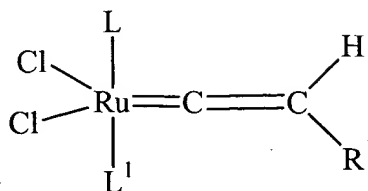
64. (New) The catalytic complex of claim 63, wherein L¹ is



65. (New) The catalytic complex of claim 63, wherein L¹ is

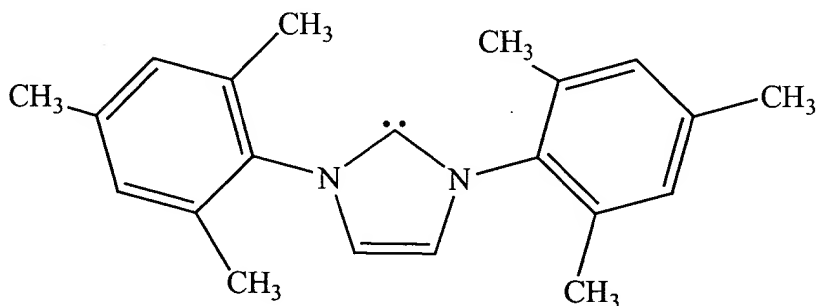


66. (New) A catalytic complex of the formula

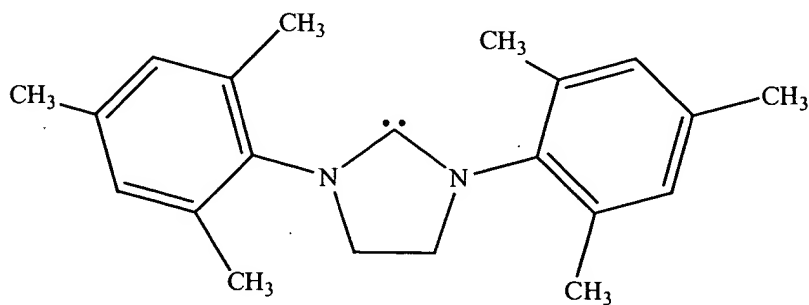


wherein L is -P(phenyl)₃, -P(cyclohexyl)₃, or -P(cyclopentyl)₃; L¹ is a nucleophilic carbene; and R¹ is C₁-C₂₀ alkyl.

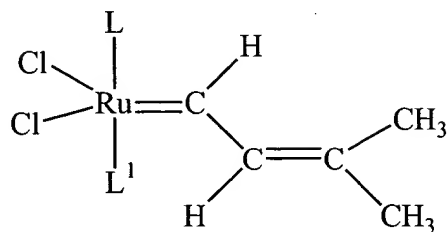
67. (New) The catalytic complex of claim 66, wherein R¹ is C₁-C₄ alkyl.
68. (New) The catalytic complex of claim 67, wherein R¹ is tert-butyl.
69. (New) The catalytic complex of claim 66, wherein L¹ is



70. (New) The catalytic complex of claim 66, wherein L¹ is



71. (New) A catalytic complex of the formula:

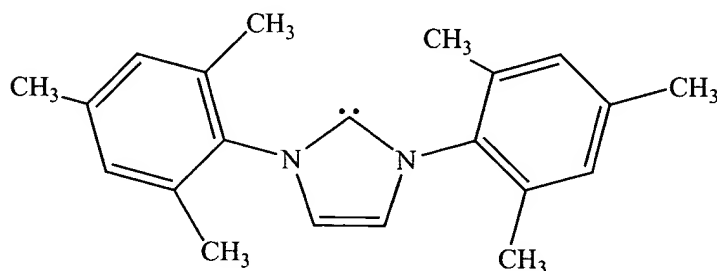


wherein

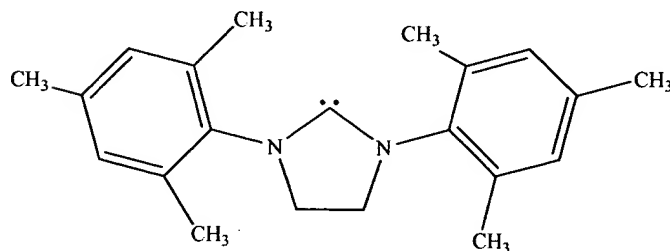
L is -P(phenyl)₃, -P(cyclohexyl)₃, or -P(cyclopentyl)₃; and

L1 is a nucleophilic carbene.

72. (New) The catalytic complex of claim 71, wherein L¹ is



73. (New) The catalytic complex of claim 71, wherein L¹ is



74. (New) A method for synthesizing a polymer material, the method comprising contacting a monomer composition with the catalytic complex of claim 9.

75. (New) The method of claim 74, wherein the monomer composition comprises a plurality of olefin molecules.

76. (New) The method of claim 75, wherein the olefin molecules are cyclic olefin molecules.

77. (New) The method of claim 23, wherein the diene is a diterminal diene.

78. (New) The method of claim 25, wherein the diene is a diterminal diene.